July 30, 1929. J. A. MANDEL 1,722,932

ROCK PICKING MACHINE

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Fig. 1.

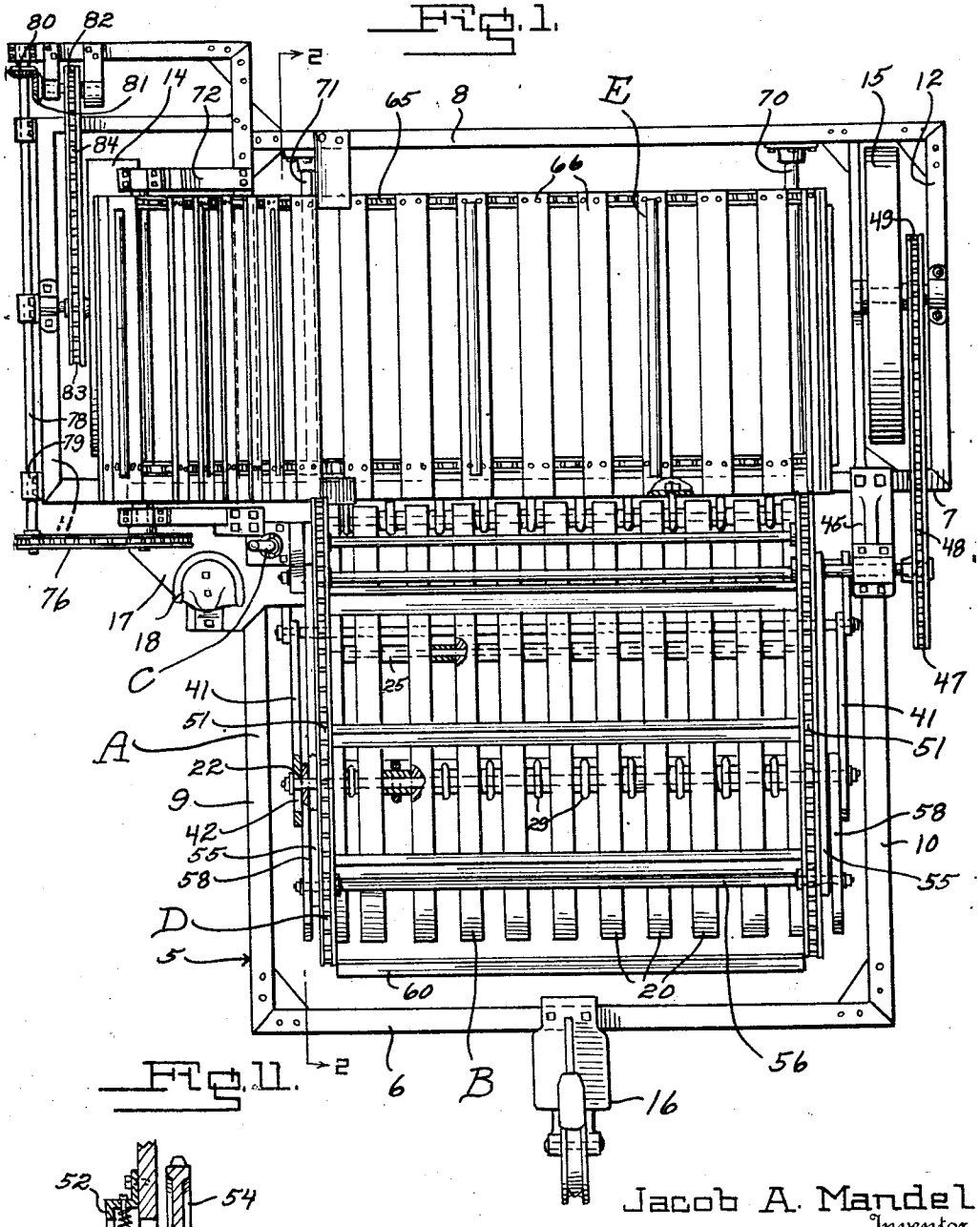
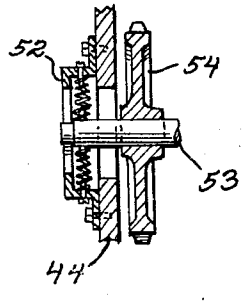


Fig. 11.



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Fig. 2.

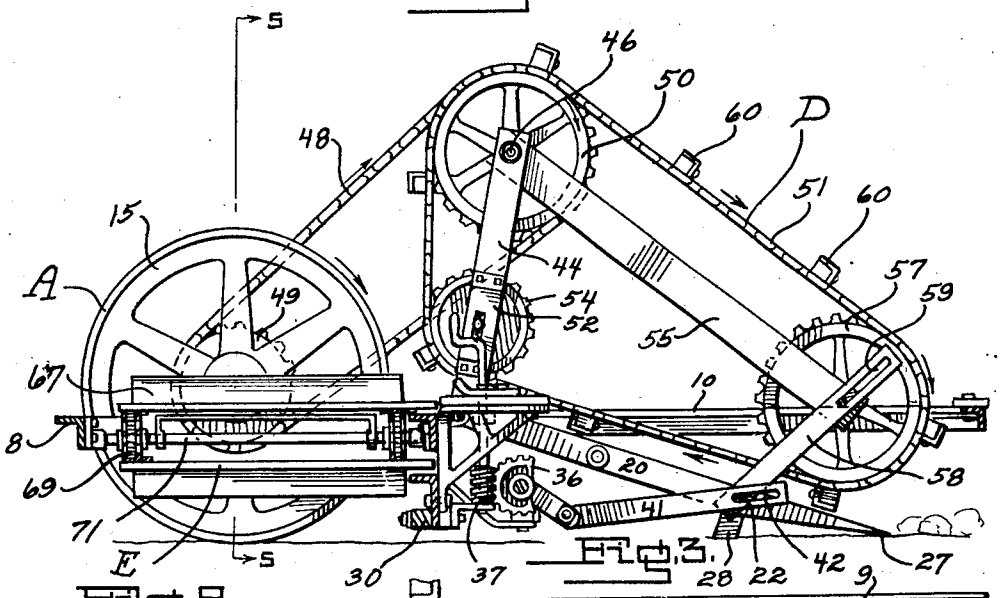


Fig. 3.

Fig. 9.

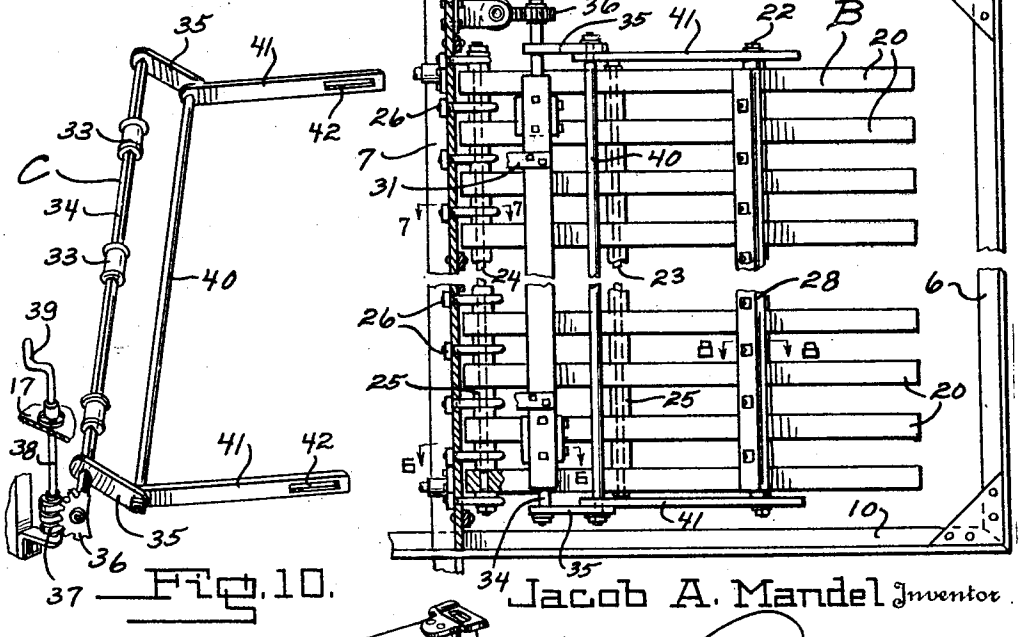
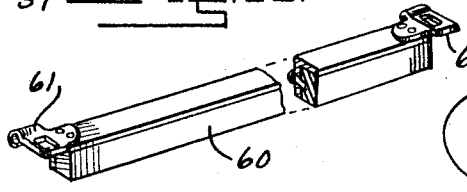


Fig. 10.



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Fig. 4

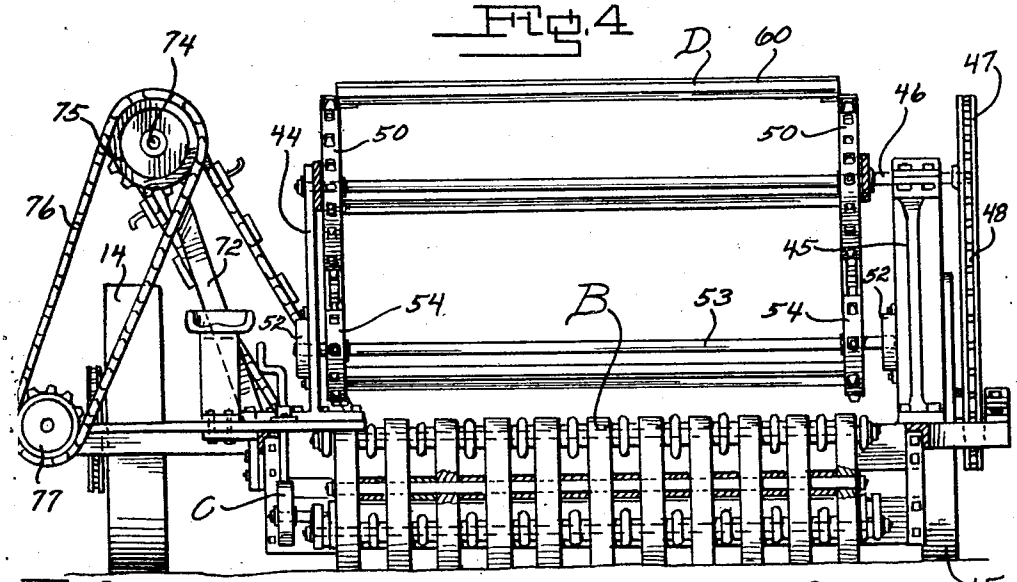


Fig. 5

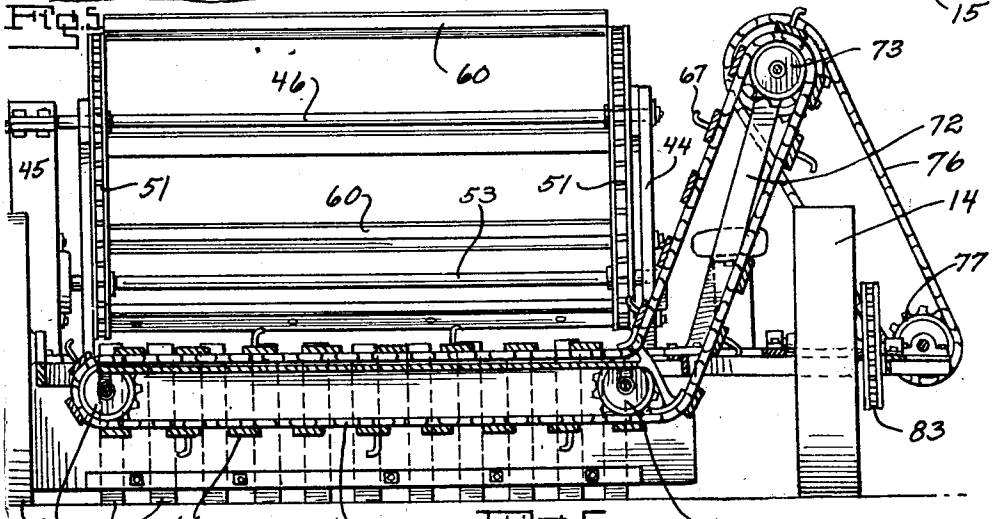


Fig. 6.

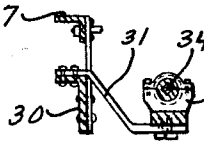


Fig. 7.

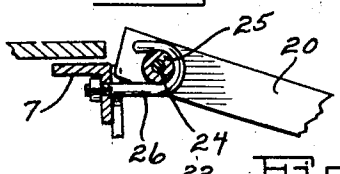
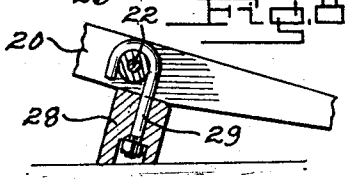


Fig. 8.



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UNITED STATES PATENT OFFICE.

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ROCK-PICKING MACHINE.

Application filed June 27, 1927. Serial No. 201,712.

The present invention relates to improvements in rock picking machines, and the primary object of the invention is to provide a machine of this character whereby large areas of ground may be cleared of surface and partly embedded stones in a facile and expeditious manner.

A further object of the invention is to provide an improved rock picking machine embodying features whereby rocks or stones of various sizes will be effectively gathered from the surface of the land for delivery into a suitable receptacle or operating in conjunction with the machine.

A further object of the invention is to provide an improved rock picking machine embodying a gatherer or picker which is readily adjustable for either gathering stones that lay on the surface of the land or which are partially imbedded therein, and also embodying features whereby the picker is free to yield upwardly when engaging relatively large stones or boulders submerged below the surface of the soil.

A still further object of the invention is to provide an improved rock picking machine which may be readily operated by a single attendant, and one wherein the conveyor means for the gathered rocks are so driven by certain ground engaging wheels of the machine as to prevent possible side drag during operation of the machine.

Other objects and advantages of the invention will be apparent during the course of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification and in which drawings:

Figure 1 is a top plan view of the improved rock picking machine.

Figure 2 is a section taken on line 2—2 of Figure 1 and looking in the direction of the arrows.

Figure 3 is a fragmentary bottom plan view of the gatherer or picker and showing the manner in which the same is pivotally mounted at its rear end upon the supporting frame of the machine.

Figure 4 is a plan view of the front end of the machine and showing a portion of the scraper means for the picker broken away.

Figure 5 is a vertical section on line 5—5 of Figure 2 and looking forwardly in the direction of the arrows.

Figure 6 is a fragmentary section on line 6—6 of Figure 3 and showing the manner in which the rocker shaft is mounted for vertical swinging of the forward portion of the picker.

Figure 7 is a fragmentary section on line 7—7 of Figure 3 and showing the pivotal mounting for the rear end of the picker.

Figure 8 is a fragmentary section on line 8—8 of Figure 3 and showing the combined gauge and brace for the forward portion of the picker.

Figure 9 is a fragmentary perspective view of the adjusting means for the picker.

Figure 10 is a perspective view of one of the scraper slats for movement of the stones rearwardly along the upper side of the picker.

Figure 11 is a fragmentary sectional view showing the yieldable mounting for one of the sprocket carrying shafts of the scraper means.

Referring to the drawings in detail, and wherein similar reference characters designate corresponding parts throughout the several views, the letter A designates a suitably formed running gear or chassis for supporting a gatherer or picker B having adjusting means C for vertical adjustment of the picker, a yieldable scraper or carrier means D for positive movement of various sized stones rearwardly over the inclined picker B, and a lateral transferer or elevator means E for receiving the gathered stones delivered at the rear end of the picker B by the means C.

Referring first to the specific construction of the chassis A, the same embodies a supporting frame 5 formed with front, central or intermediate, and rear rails 6, 7 and 8 respectively. Connecting the terminals of the front rail 6 and the middle transverse rail 7 are right and left side rails 9 and 10 respectively, which connect with the rail 7 at points intermediate the ends thereof, while connecting the terminals of the rails 7 and 8, are right and left rear side rails 11 and 12 respectively. Thus it will be seen that the rails 7, 8, 11 and 12 form an elongated open frame having its major axis extending transversely of the line of travel of the machine, while the rails 6, 7, 9 and 10 form an open frame construction forwardly of the open frame formed by the rails 7, 8, 11 and 12. Mounted in suitable bearings adjacent the rail 11, is a ground engaging wheel 14, while mounted

in suitable bearings adjacent the rail 12 is a ground engaging wheel 15 of like diameter as that of the wheel 14, and which wheels 14 and 15 may be termed right and left drive wheels respectively. These driving wheels 14 and 15 are each mounted on independent stub axles and are thus rotatable independent of one another. Carried by the front rail 6 at a point intermediate the ends thereof and preferably projecting forwardly from the rail, is an adjustable gauge wheel 16 of any preferred construction for vertical adjustment of the forward portion of the frame about the axis of the drive wheels 14 and 15 as a pivot. A suitable platform 17 is preferably provided adjacent the juncture of the rails 7 and 9, and if so desired a suitable seat as at 18 may be mounted upon the platform for the operator of the machine. Any suitable draft means may be provided for drawing the machine over the surface from which it is desired to remove loose stones that lie on the surface or which are partially embedded in the soil.

Referring now to the construction of the picker B, and which is intended to be mounted in the open frame formed by the rails 6, 7, 9 and 10, the same consists of a suitable number of picker fingers or teeth 20 each of which are of identical construction and are provided with chisel like forward ends 27 for allowing the teeth to readily penetrate the sub-soil when desiring to remove partially embedded stones in addition to those lying on the surface. These elongated picker fingers 20 are secured in parallel relation to one another as by means of suitable tie rods 22, 23 and 24 which extend respectively transversely through the forward intermediate and rear terminal portions of the fingers. As will be observed, the forward tie rod 22 is spaced a considerable distance from the forward pointed ends 27 of the fingers 20, while the rear tie rod 24 is arranged relatively close to the rear terminal portions of the fingers. Suitable spacing sleeves 25 encircle the tie rods between each adjacent pair of picker fingers and thus serve as means for retaining the fingers in proper spaced relation so that loose dirt falling from the rocks being gathered and being moved along the upper side of the picker fingers may readily fall through the openings between the fingers and not be conveyed to the lateral transfer means E. The length of the spacing sleeves 25 may be varied for allowing the teeth 20 to be spaced either closer or further apart than shown in accordance with the size of the stones which it is desired to remove from the surface of the land. The rear tie rod 24 is intended to serve as a pivot means for the picker, and encircling the spacing sleeves 25 between each of the fingers 20 at the rear end of the picker, are J shaped anchor bolts 26 which extend through the depending flange portion of the L-shaped middle rail 7 as is clearly illustrated in Figures 3 and 7. Thus it will be seen that the anchor bolts 26 serve as a means for pivotal mounting of the picker B at its rear end upon the supporting frame 5 in a manner for allowing ready vertical adjustment of the pointed forward ends 27 of the picker fingers. Extending transversely of the picker fingers 20 beneath the foremost tie rod 22, is a combined brace and gauge strip 28 which may be formed of wood, and carried by the gauge strip 28 is a series of J-shaped bolts 29 which extend upwardly between each adjacent pair of picker fingers and have their hook shaped heads engaging the spacing sleeves 25 of the tie rod 22. As will be observed in Figure 2, this gauge strip 28 by reason of its movement along the ground surface will aid in preventing the forward ends of the picker fingers 20 from penetrating the earth to a greater depth than desired. It will also be apparent by observing Figures 2 and 7, that the picker B is inclined upwardly and rearwardly with the upper surface of the picker at its rear portion disposed slightly above the horizontal supporting rail 7 upon which the picker is pivotally mounted.

Referring now to the adjusting means C for vertical movement of the forward end of the gatherer or picker B, the same embodies a supporting sill 30 which is suitably mounted longitudinally beneath the middle transverse rail 7, and which sill has projecting forwardly therefrom suitable brackets 31 carrying at their forward ends suitable bearing boxes 32. Mounted for rotation in the boxes 32 as by means of suitable sleeves 33 as illustrated in Figure 9, is a square rocker shaft 34 which extends transversely beneath the rear portion of the picker fingers 20, and rigidly mounted upon the shaft 34 outwardly of each side of the picker B, are forwardly and downwardly inclined crank arms 35 which are adapted to be swung in an arc upon rotation of the rocker shaft 34. Mounted upon the right hand end of the rocker shaft 34 is a segmental shaped gear 36 having meshing relation with a worm gear 37 mounted upon the lower end of a vertically extending operating shaft 38 which extends upwardly through the platform 17 adjacent the driver's seat 18 and is provided at its upper end with a suitable crank 39 whereby the shaft 38 may be readily rotated for imparting rotary movement to the rocker shaft 34. Connecting the forward end of the crank arms 35 is a shaft 40 which extends parallel to the rocker shaft 34, and freely mounted at their rear ends upon the shaft 40 are picker elevating arms 41 which extend forwardly and upwardly from the shaft 40 and are provided at their forward ends with longitudinally extending slots 42 through which the terminal portions of the foremost tie rod 22 of the picker B ex-

tend. By observing Figure 2 it will be seen that the tie rod 22 normally engages the rear terminal of the slots 42 in a manner whereby the forward end of the picker fingers are prevented from moving downwardly but are free to swing upwardly by allowing the tie rod 22 to move forwardly in the slot 42. With this construction it will be seen that should the pointed ends 27 of the picker fingers engage a rock or stone embedded in the soil, that the teeth will be allowed to swing upwardly and pass thereover without creating undue strain upon the elevating means C. When desiring to raise or lower the forward end of the picker B it is merely necessary for the operator to rotate the shaft 38 by means of the crank 39 for rotating the rocker shaft 34 and moving the elevating arms 41 forwardly or rearwardly for respective raising or lowering of the forward end of the picker. It is preferred that the gear 36 be of segmental shape since such will allow for limited upward and downward swinging of the forward end of the picker when the worm 37 has rotated the gear 36 in either direction for the extent of the teeth provided thereon.

The yieldable scraper or carrier means D for positive movement of stones of various sizes rearwardly over the inclined picker B, embodies a pair of right and left supporting uprights 44 and 45 respectively, and which upright supports are suitably mounted upon the transverse rail 7 at points spaced to each side of the rear portions of the picker B. Rotatably mounted in suitable brackets at the upper end of the uprights 44 and 45 is a drive shaft 46 which extends to the outer side of the upright 45 and has mounted thereon a suitable sprocket wheel 47 over which a suitable drive chain 48 is trained. This drive chain 48 is also trained about a sprocket wheel 49 mounted for rotation with the left hand drive wheel 15 so that upon rotation of the drive wheel 15 a rotary movement will be imparted to the scraper drive shaft 46. Mounted for rotation with the shaft 46 are suitable sprockets 50 which are arranged inwardly of the uprights 44 and 45, and over each of the sprockets 50 is trained an endless sprocket chain 51 which form the side chains of an endless conveyor having movement at one portion rearwardly over the upper face of the picker B. Mounted for rotation in vertically yieldable bearings 52 carried by the uprights 44 and 45 below the drive shaft 46, is an idler shaft 53 and upon which is mounted directly below the sprocket wheels 50, companion idler sprockets 54 over which the endless chains 51 are trained in slightly spaced relation above the rear portion of the picker B. By observing Figures 2 and 11 it will be seen that these yieldable bearings 52 will allow for the shaft 53 together with its sprockets 54 to yield vertically toward and away from the picker. Pivotally mounted at their rear ends to opposite ends of the drive shaft 46 and extending forwardly and downwardly at each side of the picker B, is a pair of supporting arms 55 which rotatably support at their forward ends a sprocket shaft 56 and upon which shaft is mounted a pair of sprockets 57 in alignment with the companion sprockets 50 and 54. Thus it will be seen that the sprockets 54 and 57 will cause portions of the chains 51 to move in parallel spaced relation above the picker B. Pivotally mounted at their lower ends upon each terminal portion of the tie rod 22 and extending at an angle upwardly and forwardly therefrom, is a pair of relief arms 58 being provided adjacent their upper ends with longitudinally extending guide slots 59 for receiving the terminal portion of the sprocket shaft 56. As will be observed in Figure 2, the sprocket shaft 56 normally rests in the lower extremity of the slots 59 for retaining the sprockets 57 normally spaced above the upper surface of the picker B. Connected in parallel spaced relation between the endless side chains 51 is a series of carrier slats or drag slats 60 which may be connected with the chains as by means of suitable links 61 having projections for attachment with the slats. These slats 60 are preferably formed of angle iron and may be reinforced with suitable strips of wood secured inwardly of the flanges of the angle iron.

By so providing the relief arms 58 with the slots 59 it will be seen that should one of the carrier slats 60 engage one of the rocks being gathered, that such will allow for the sprockets 57 to yield upwardly and thus prevent the stone from becoming wedged between the slat and upper surface of the picker and result in possible breaking of the sprocket chains 51. Likewise, it will be seen that when one of the stones is being moved up the inclined picker beneath one of the carrier slats or drag slats 60, that the bearings 52 will allow for the sprockets 54 to yield upwardly for preventing any binding action beneath the slats when passing under the sprockets 54.

Referring now to the lateral transfer means E for receiving the gathered stones delivered at the rear end of the picker B by the carrier means D, the same preferably embodies an endless conveyor embodying side chains 65 connected by a series of spaced slats 66 certain of which may be provided with suitable extensions 67. These side chains 65 are trained over suitable sprockets 68 and 69 mounted on suitable shafts 70 and 71 respectively which are supported between the frame rails 7 and 8. That portion of the endless conveyor when moving over the sprockets 68 and 69 will form a horizontal

platform at the rear of the picker B upon which the stones are delivered by means of the carrier D. Mounted at the upper end of suitable brackets 72 arranged adjacent the right hand drive wheel 14, are sprocket wheels 73 over which the side chains 65 pass for causing the gathered stones to be elevated and deposited in a suitable receptacle or delivered into a suitable chute through which the stones may pass into a wagon or suitable vehicle. Mounted upon the forward end of the shaft 74 upon which the sprockets 73 are mounted, is a drive sprocket 75 over which a drive chain 76 is trained and leads to a suitable sprocket 77 mounted on a shaft 78 mounted in suitable bearings 79 supported by the right rail section 11. Keyed to the rear end of the shaft 78 is a bevel gear 80 in meshing relation with a second bevel gear 81 mounted upon a stub shaft carrying a sprocket wheel 82. Trained over the sprocket wheel 82 and a sprocket wheel 83 keyed to the axle of the drive wheel 14, is a drive chain 84 which serves for imparting movement to the transfer means during travel of the rock picking machine. Thus it will be seen that the carrier means D is driven by the left hand drive wheel 15 while the transfer means E is driven by the right hand drive wheel 14 so that no side draft is created during operation of the machine.

From the foregoing description it will be apparent that an improved and novel type of rock picking machine has been provided embodying a picker of novel and improved construction provided with adjusting means whereby the ground engaging portion is readily adjustable for clearing the land surface of loose stones or gathering of stones embedded in the soil, and embodying a novel carrier means whereby the stones are moved rearwardly over the picker without likelihood of possible clogging or binding and resulting in injury to the moving parts of the machine. It will also be apparent that a novel arrangement has been provided whereby the carrier means is caused to have vertical adjustment imparted thereto through vertical adjustment of the picker means.

Changes in the shape, size and arrangement of parts may be made to the specific form of the invention herein shown and described, without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. In a rock picking machine, a supporting frame, a picker pivotally mounted at its rear portion upon the frame, elevating means for the forward portion of the picker, supporting uprights carried by the frame at each side of the rear portion of the picker, drive sprockets mounted at the upper portion of the uprights, idler sprockets mounted at the lower portion of the uprights above the rear end of the picker and yieldable toward and away from the upper surface of the picker, supporting arms pivotally carried by each upright and extending forwardly therefrom, sprocket wheels mounted at the forward portion of each supporting arm, relief arms pivotally supported at their lower ends upon the forward portion of the picker and having slotted ends for connection with the forward portions of the supporting arms for allowing upward swinging thereof, endless sprocket chains trained over the sprockets, and carrier slats connected between the sprocket chains and movable rearwardly over the upper surface of the picker for delivery of the gathered stones at the rear end of the picker.

2. In a rock picking machine, a supporting frame, a picker pivotally mounted at its rear portion upon the frame, elevating means for the forward portion of the picker, uprights supported upon the frame at each side of the rear portion of the picker, yieldable bearings carried by the lower portion of each upright, idler sprockets mounted in each yieldable bearing, a drive shaft mounted in the upper portions of the uprights, drive sprockets mounted on the shaft adjacent each upright, supporting arms pivotally mounted at one end upon the drive shaft and extending forwardly therefrom, a sprocket shaft mounted at the forward portions of the arms and carrying sprockets aligning with the sprockets supported by said uprights, relief arms pivotally mounted at their lower ends upon the forward portion of the picker and having longitudinally extending slots provided adjacent their upper ends for receiving the terminal portions of said sprocket shaft, endless sprocket chains trained over the pairs of sprocket wheels at each side of the picker, and drag slats connecting the sprocket chains and movable rearwardly over the upper surface of the picker.

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